River, suffered many vicissitudes. There was frost almost every night, and the average temperature was only 35°, being the coldest for thirty years. On the 10th, the anniversary of the blizzard of 1888, the minimum was only 2° above zero. A vivid picture of the ice storm that prevailed during the 15–17th is published by Mrs. Britton, the wife of the director of the garden, in the first volume of the journal of the New York Botanical Garden. She says:

Notwithstanding the cold weather of the month, there have been warm, quiet days and abundant signs of spring. The hylas were peeping and the snow-drops were blooming in the nurseries on the 10th, and robins, meadow-larks, and song-sparrows had been singing. The sap of the sugar-maples flowing from broken twigs had made icicles several inches long during the night, and a few venturesome silver-maples had thrust out their pale stamens. On the 15th the second snowstorm of the year arrived, quietly piling up eight inches of snow on the level, and changing to sleet during the night. The next morning dawned clear and cold, the sky was blue and cloudless, and every common thing stood transformed to crystal, tinkling with icicles and hung in prismatic rainbows.

We may look to the authorities of the New York garden for phenological records that will permit full and reliable comparison with similar data from other parts of the world, and with that for the early years of our own settlements.

Three meteorological stations have been established in the garden. Station 1 is located in the herbaceous grounds. Station 2 is on a low ridge in the center of the hemlock forest. Station 3 is in the central portion of the elevated plain of the fructicetum, which is bordered on the east by a deciduous forest, and on the south by artificial lakes and the hemlock forests. The thermometers are contained in shelters of the United States Weather Bureau pattern. This new meteorological station is about 12 miles northeast by north from the regular Weather Bureau station. The record at botanical garden, station 1, for April is as follows: Precipitation, 2.39 inches. Maximum temperatures, 77°, at 2 p. m. on the 30th. Minimum temperatures, 21.5°, at 6.30 a. m., on the 10th.

STORM IN YUCATAN.

A report from Merida, Yucatan, states that "a terrific hurricane struck here April 23, resulting in great loss of property." On that date an extensive area of low pressure had its southern extremity in the Gulf of Mexico, and severe local storms may have prevailed in that region, but nothing sufficiently extensive to be called a hurricane seems likely to have occurred. Apparently, this is another case of the reportorial use of high-sounding words. A destructive wind may be a norther, a tornado, a thunderstorm gust—it may even be called a wind of hurricane force—but it is not a hurricane. The latter term applies to a destructive wind circulating about a local area of low barometric pressure, and moving day after day along the surface of the earth. Later in the summer the local storms of the West Indies and Gulf of Mexico may develop into grand hurricanes, but these are not likely to occur so early as April or May.

LOCAL ANEMOMETRIC PECULIARITIES.

In the annual report for 1899 of the Fernley Observatory, at Southport, England, lat. 53° 39′ 24″ N.; long. 2° 59′ 3″ W., therefore, about twenty miles north of Liverpool, the meteorologist, Mr. Joseph Baxendell, gives some accounts of experiments with the pressure tube anemometer devised by Dines, but essentially based on the principles involved in the Hageman anemometer. He says:

Although no very thorough or detailed comparison between the indications of the Dines pressure tube anemometers at the Hesketh Park Observatory, and the Marshside station has yet been made, the average difference between the wind force at the two situations is so remarkable that it may be of interest to give, without further delay, the monthly mean values of wind velocity during 1899, at the respective stations.

The "head" of the Dines instrument at Hesketh Park is 36 feet above the summit of the highest hill or knoll in the town, and 26 feet above the top of the roof of the Fernley structure, by which the knoll is capped. It is 85 feet above mean sea level. Some further idea of its exposure and surroundings may be obtained from an inspection of the frontispiece to the annual report for 1897.

The "head" of the Dines anemometer at Marshside is 50 feet above very level ground, and 40 feet above the roof of the brick hut. It is 66 feet above mean sea level. In this case there is a very open exposure, and a large majority of winds reach the instrument without having previously encountered any seriously deflecting or obstructing object.

Mean velocity of the wind.

1899.	Hesketh Park. Miles per hour.	Marshside. Miles per hour.	1899.	Hesketh Park. Miles per hour.	Marshside. Miles per hour.
January	7.0	14.0	August	4.8	10.0
February	6.5	10.5	September	8.3	18.0
March	5.2	12.1	October	4.5	11.7
April	8.0	14.0	November	7.1	15.5
May	4.4	8.9	December	5.0	10.7
June	3.9	8.9			
July	4.6	11.8	Year	5.8	12.2

Every possible precaution has been taken to insure the accurate working of the two instruments. The one at Hesketh Park has been dismounted and entirely refitted, the pipes also being tested, but the differences continue as before.

Although these two anemometers are not very far apart yet there is *a priori* no special reason for surprise at the great difference between the two records. When the wind blows over an obstacle, or a series of obstacles, there is at once produced a systematic derangement in the otherwise steady streams of air which are now thrown into violent contortions and the individual currents so interfere with each other as to greatly diminish the average velocity of the wind over a large region in the rear of the obstacle. An exploration of the surrounding region usually shows that the wind is blowing its full strength in various unexpected places, between which are found minor currents due to the obstacles. Above and outside of these currents the wind also blows with full strength.

In the present case the winds reach the Marshside anemometer with much less interruption from distant trees and structures, and we can but believe that the records for the two stations differ from this reason only and not because of errors in the apparatus.

THE SEASONAL RAIN IN COLORADO.

In the annual summary of the Colorado section Mr. F. H. Brandenburg, Section Director, gives not only the annual numerical tables, but a general review for the winter 1898–99, from which it appears that much more than the normal amount of snow fell, forming vast drifts, so that on July 1, 1899, a much greater amount was stored in protected places at great altitudes than usual, giving good prospects for a steady flow in summer. Mr. Brandenburg also contributes a chapter to a discussion of long-range or seasonal forecasts. He shows that, so far as concerns the temperature records at Denver, the average temperature for a season, or a longer period, has apparently no connection with the temperature of the coming season; that, in general, an exceptionally warm spring or summer does not follow an abnormally cold winter. The compensations occur, not in the immediately following seasons, but at uncertain intervals of time.

With regard to precipitation at Denver, he finds that notably dry or wet seasons are more likely to be followed by nearly normal seasons than by the complementary characteristics; so that here again, as with temperature, it is not true that a warm or a dry winter is followed by a cold or wet summer, or vice versa.

FRESHETS IN JAMES RIVER, VA.

The annual summary of the Virginia section contains an excellent article on the combinations of circumstances that bring about freshets in the James River, We copy the following table showing the principal freshets during the past thirty years. Concerning these cases, twenty-six in all, Mr. E. A. Evans says:

Fourteen, or 54 per cent, occurred during months when the absorption by the soil and the evaporation by the wind were at a minimum; five, or 19 per cent, when evaporation was greater, but absorption was retarded by the prior sodden condition of the ground; seven, or 26 per cent, occurred when both evaporation and absorption were at a maximum, but when the rate of rainfall was greater.

Maximum river gage readings showing height above low water during important freshets in the James River, Va.

Date.	Lynchburg.	Scottsville.	Columbia.	Richmond.*	Ratio of Columbia to Richmond.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Per ct.*
October, 1870	14.4	28.8	39.0	27.0	69.3
November, 1877	11.8	26.3	37.5	28.6	76.3
March, 1884	9.8	14.0	20.0	13.7	68.5
March, 1884	12.2	17.4	24.0	15.7	65.4
October, 1885	13.0	16.2	30.5	15.9	52.1
November, 1885	....	....	30.5	14.2	46.4
January, 1885	....	17.0	24.0	14.7	61.1
April, 1886	10.8	22.5	32.0	24.3	75.9
July, 1886	....	....	23.8	17.2	72.3
August, 1889	....	....	29.5	22.5	76.3
June, 1889	....	....	32.5	25.2	77.5
April, 1891	....	....	20.5	14.4	70.2
January, 1892	....	....	20.3	13.5	66.5
May, 1893	13.9	17.8	27.0	16.9	62.6
January, 1895	10.5	18.4	28.3	18.2	64.2
March, 1895	....	....	20.0	12.7	63.5
April, 1895	15.2	19.2	26.0	16.4	63.0
July, 1896	10.2	14.2	19.3	12.5	64.9
October, 1896	15.7	....	28.5	16.7	58.6
February, 1897	....	....	21.7	11.9	62.6
February, 1897	....	17.5	26.2	15.0	65.3
October, 1898	12.0†	....	....	11.7	....
January, 1899	8.6†	....	....	18.5	....
February, 1899	5.6†	....	....	22.0	....
March, 1899	19.0†	....	....	20.5	....
March, 1899	7.7†	....	....	13.6	....

*Readings taken from United States James River improvement gage until 1897, when they were taken from Bureau gage. † On Bureau gage.

PHENOLOGY IN OHIO.

In the annual summary of the Ohio section Mr. J. Warren Smith, Section Director, discusses the question of the relation of temperature to the date of harvesting wheat. The harvest data for twelve consecutive seasons at Wooster, Ohio, and for forty-four consecutive years at Osborn, Ohio, are compared with the mean temperatures and total rainfall of April, May, and June at the same or neighboring stations. In general, Mr. Smith finds that the dates and the temperatures fluctuate together, the dates being earlier in proportion as the mean temperature of the three months is above the normal and late when the temperature is below the normal. On the contrary, the precipitation varies inversely as the date; a deficit in rain causes an earlier harvest. Thus in 1899 the date of harvesting was the earliest on record, coinciding with the greatest recorded deficiency in rainfall.

As this study relates to winter wheat, we may remark that it has been customary for European students usually to calculate the sum total of the effective temperatures from the date of sprouting, and it is likely that such calculations would have made some appreciable differences in the Ohio temperatures. With regard to precipitation, we are inclined to think that the acceleration of the date of harvest by droughts and clear weather, or its retardation by rain and cloudy weather is mostly effected during the three months, April, May, and June, tabulated by Mr. Smith. However, we think that the total temperature or rainfall for the month of June ought scarcely to be considered in studying those years in which the wheat ripens as early as June 20.

As the dates of harvesting winter wheat may be needed by others in climatological studies we reprint the figures given by Mr. Smith. On the average, the Wooster date is 6.6 days later than the Osborn date:

Dates of harvesting wheat.

Year.	Osborn, Ohio.	Wooster, Ohio.	Year.	Osborn, Ohio.	Wooster, Ohio.
1856	June 28	....	1878	June 25	....
1857	July 16	....	1879	June 27	....
1858	July 1	....	1880	June 21	....
1859	June 28	....	1881	....	....
1860	June 25	....	1882	July 4	....
1861	July 1	....	1883	July 6	....
1862	June 30	....	1884	July 3	....
1863	June 30	....	1885	July 9	....
1864	July 1	....	1886	June 28	....
1865	June 29	....	1887	June 23	....
1866	July 6	....	1888	July 4	July 8
1867	July 1	....	1889	June 29	July 3
1868	July 6	....	1890	June 27	July 3
1869	July 5	....	1891	June 27	July 1
1870	June 25	....	1892	June 29	July 2
1871	June 26	....	1893	July 3	July 8
1872	July 4	....	1894	June 28	July 8
1873	July 1	....	1895	June 25	July 6
1874	June 26	....	1896	June 22	July 3
1875	July 12	....	1897	July 2	July 7
1876	July 1	....	1898	June 23	July 2
1877	June 29	....	1899	June 20	June 27

HAIL AND ITS METHODS OF FORMATION.

In the March report of the Virginia section Mr. E. A. Evans, Section Director, gives some interesting items with regard to the unusual features of the snowstorm of March 25, 1900:

The morning of this date was cloudy, with a fresh, chilling, northeast wind. The temperature rose slowly during the forenoon, and at 1:17 p. m. a light rain began to fall. Soon sleet accompanied the rain, and later the rain ceased and sleet alone fell. Some of these icy particles were nearly cubiform, measuring perhaps one-fourth of an inch either way. Mixed with these was the sleet ordinarily seen—the small spheres of frozen rain. At 5:25 p. m. moist snow fell with sleet. At first the flakes were not large enough to be specially noticeable, but as the fall of sleet diminished in volume, which it immediately did, the size of the flakes increased until they attained unusually large proportions. They were of irregular shape, mostly oblong; several were seen the greatest diameter of which could hardly be covered by a teacup. Some were caught upon a piece of dry wood and examined. In every instance the center of the flake was composed of a soft mass of snow about half an inch in diameter, while the outer edges were thin, looking as though they might have been separate flakes which had attached themselves to the central mass while it was falling. The weight of the center being greater than that of the edges caused the larger ones to assume the form of an inverted cone in falling, the outer edges being bent up by the resistance of the air.

Three of the large flakes were caught in a bowl, yielding, when melted, nearly a tablespoonful of water. There was nothing at hand from which an absolute measurement could be had, but it is estimated that it would have closely approximated one one-hundredth of an inch. The flakes were widely separated from one another and did not obscure the vision in looking upward toward the sky.

The above interesting description reminds one of the natural snowballs described by the observers on Pikes Peak during the early years of the occupation of that station. These balls are said to have been 2 or 3 inches in diameter, and it was supposed that by melting and recongealing as they fell they formed icy hail with snowy nuclei. In the present case the lenticular snowflakes are said to have had a denser mass of